

8 | 0315

10/523005  
DT12 Rec'd PCT/PTO 01 FEB 2005

1

PACKAGING CONTAINER AND METHOD OF PRODUCING THE SAME

BACKGROUND OF THE INVENTION

Field of the Invention

5       The present invention relates to a packaging container and a method of producing the same, and especially to an opening peripheral edge encompassing an opening of a packaging container.

10   Description of Related Art

      Among synthetic resin packaging containers, containers having an inside storage part formed by sheet molding recently have come to need space saving property. Therefore, needs have changed from  
15   containers molded of a foamed sheet to containers molded of thin synthetic resin sheet. A synthetic resin sheet is molded into a container shape and then the peripheral edge of the container shape is cut, whereby a container molded of thin synthetic resin sheet can  
20   be obtained. Generally, such a packaging container has a shape provided with a wide opening. A packaging container of this shape comprises a bottom plate, a peripheral side wall upwardly extending from the periphery of the bottom plate, and an opening  
25   peripheral edge encompassing an opening and outwardly

extended from the upper edge of the peripheral side wall.

Further, a lid to be put on a container is manufactured also by molding a thin synthetic resin sheet into a lid shape. Some lids are molded into  
5 complicated shapes in order to have a good design. However, generally, a lid has an opening peripheral edge encompassing a lid opening and extended outwardly, obliquely downwardly or downwardly in order to engage  
10 with the upper edge of the peripheral side wall and the opening peripheral edge of the container.

A container or a lid molded of a thin synthetic resin sheet is separated from the sheet by cutting the above-mentioned opening peripheral edge thereof.  
15 Therefore, the opening peripheral edge is elongated in straight and/or smoothly curved fashion along the outline of the container or the lid.

As a result, there is a problem that such an opening peripheral edge elongated along the outline  
20 of a container or a lid is apt to hurt user's hand or finger at the time of using the container or the lid since the material sheet thereof is thin.

Further, at the time of putting an article into such a container and wrapping the same with a wrapping  
25 film, the wrapping film is rubbed against the opening

peripheral edge and sometimes cut. Therefore, there is a problem that much time and labor is required to wrap such a packaging container with a wrapping film.

## 5 SUMMARY OF THE INVENTION

Therefore, an object of the present invention is to solve the above-mentioned problems by providing a method for manufacturing a safe and easily treatable packaging container having an opening peripheral edge  
10 of an improved structure.

A packaging container according to the present invention is one whose opening peripheral edge encompassing an opening is cut, and the container is characterized in that the opening peripheral edge  
15 thereof is not elongated straight but is finely corrugated in the longitudinal direction.

Even though a packaging container according to the present invention is molded of a thin synthetic resin sheet, the finely corrugated opening peripheral  
20 edge in the longitudinal direction thereof has a lower sharpness than a thin peripheral edge elongated straight has. As a result, if user's hand, finger or the like is rubbed against the opening peripheral edge, the hand, finger or the like can be prevented  
25 from being hurt.

Further, even if a wrapping film is stretched on and rubbed against the opening peripheral edge, the wrapping film can be prevented from being broken.

## 5 BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a perspective view of a container body of a packaging container according to one embodiment of the present invention.

Figs. 2(A) - 2(C) are partly enlarged views of  
10 section A of the container body of the packaging container of Fig. 1.

Fig. 3(A) - 3(C) are partly enlarged views of a main part of a packaging container according to another embodiment of the present invention.

15 Fig. 4(A) and 4(B) are enlarged views of a main part of a packaging container according to a further embodiment of the present invention.

Fig. 5 is an illustrative plan view of a container body or a lid of a packaging container for explaining  
20 a peripheral edge thereof to be corrugated.

Fig. 6 is an illustrative plan view of a packaging container in which a container body and a lid are connected to each other for explaining the positions of a peripheral edge thereof to be corrugated.

25 Fig. 7 is a view illustrating an example of the

shape of a container body of a packaging container and showing the positions to be corrugated.

Fig. 8 is a view illustrating an example of the shape of a lid of a packaging container and showing the positions to be corrugated.

Fig. 9 is a perspective view of an example of a metal mold for molding a sheet.

Fig. 10 is a front view showing the cutting operation of a packaging container by a Thomson blade.

10

#### DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

Fig. 1 is a perspective view of a container body of a packaging container according to one embodiment of the present invention. And Figs. 2(A) - 2(C) are a partly enlarged perspective view, a plan view and a front view of section A of the container body 1 of the packaging container of Fig. 1.

In this embodiment, the container body 1 is explained as a packaging container. The container body 1 has a bottom plate 20 and a peripheral side frame (peripheral side wall) 10 standing obliquely outwardly at the periphery of the bottom plate 20. The bottom plate 20 has, for example, a substantially rectangular shape with rounded four corners. Therefore, the container body 1 has, as a whole, a shape of a deep

rectangular dish. And the upper end of the peripheral side frame 10 defines an opening of the container body 1. An outwardly extended flange 11 is formed at the upper end of the peripheral side frame 10. The flange 11 constitutes a peripheral flange encompassing the upper end of the peripheral side frame 10, namely, encompassing a container opening. The flange 11 serves for reinforcing the container opening both in the inward and outward directions.

10       The outer peripheral edge 11a of the flange 11 is finely corrugated. In the embodiment shown, the outer peripheral edge 11a of the flange 11 is finely corrugated when seen in the horizontal direction. In this case, the difference  $d$  between the top and the bottom of the corrugated shape (waveform) is not more than 0.5 mm. Further, the pitch  $p$  (the distance between the tops or bottoms) of the corrugated shape (waveform) is about 1mm.

20       In this respect, the difference  $d$  between the top and the bottom of the waveform may be in the range of 0.2 - 1.0 mm and is preferably not more than 0.5. And the pitch  $p$  may be in the range of 0.5 - 5.0 mm and is preferably about 1.0 mm.

25       By determining the size of the waveform in the above-mentioned value ranges, user's hand and finger

can be prevented from being hurt and the wrapping film can be prevented from being broken by the outer peripheral edge 11a of the flange 11.

Figs. 3 (A) - (C) are a partly perspective view, a plan view and a front view showing another shape of a flange 11 extended outwardly from the upper end of the peripheral side frame 10 of the container body 1. In the embodiment shown in Figs. 3 (A) - (C), the whole of the flange 11 encompassing the container opening is finely corrugated in the vertical direction. As a result, the outer peripheral edge 11a of the flange 11 is substantially straight in a plan view, but the outer peripheral edge 11a extending in the lateral (horizontal) direction is finely corrugated in the vertical direction in a side view (seen in the horizontal direction). The difference  $d$  between the top and the bottom of the corrugated shape (waveform) is in the range of 0.2 - 1.0 mm similarly to the above-mentioned embodiment, and the pitch  $p$  (the distance between the tops or bottoms) of the waveform is in the range of 0.5 - 5.0 mm.

The direction of the corrugation of the outer peripheral edge 11a of the flange 11 may be a horizontal direction in which case the waveforms can be seen in plan view as in the above-mentioned embodiment, or may

be a vertical direction in which case the waveforms can be seen in the lateral (horizontal) direction as in this embodiment.

Otherwise, by combining the above-mentioned  
5 embodiment and this embodiment, the outer peripheral edge 11a of the flange 11 may be complexly corrugated both in the lateral (horizontal) and vertical directions.

Anyway, since the outer peripheral edge 11a of  
10 the flange 11 is finely corrugated, the outer peripheral edge 11a does not form a straight edge such as one cut from a flat thin resin sheet but forms a finely waved or corrugated edge. As a result, the outer peripheral edge 11a of the flange 11 according to the  
15 present invention can prevent user's hand and finger from being hurt and prevent a packaging film from being broken by contacting the outer peripheral edge.

Figs. 4(A) and 4(B) are partly enlarged views illustrating the structure of a flange 11 and an outer  
20 peripheral edge 11a thereof according to a further embodiment of the present invention.

As shown in Fig. 4(A), minute projections and recesses are formed throughout the flange 11. That is, a number of minute projections 12 protruding on the  
25 upper surface side of the flange 11 and a number of



minute recesses 13 depressed on the reverse side of the flange 11 are regularly formed. And as shown in Fig. 4(B), the outer peripheral edge 11a obtained by cutting such a flange 11 forms a vertically corrugated edge defined by a cutting line crossing the number of minute projections 12 and a number of minute recesses 13 formed throughout the flange 11.

In the case of this embodiment, the outer peripheral edge 11a of the flange 11 is also not straight but corrugated, so that the sharpness with respect to user's hand and finger and a packaging film can be reduced.

In the above-mentioned embodiments, described are package containers having a corrugated opening peripheral edge encompassing the opening of the container body 1. However, the present invention can be applied not only to the container body 1 but also to an opening peripheral edge of a lid to be put on the container body 1. That is, when a packaging container, especially one for packaging food or the like is molded of a thin synthetic resin sheet, not only a container body thereof but also a lid to be fitted to the container body is manufactured. Similarly to the case of the container body, the opening peripheral edge of the lid is cut out of a synthetic resin sheet.

Therefore, by forming the opening peripheral edge of the lid in a corrugated shape, the opening peripheral edge of the lid can have a soft touch instead of a sharp touch.

5        Fig. 5 is an illustrative plan view of a container body 1 or a lid 18, in which a flange 11 is shown by cross-hatching. Any of the corrugated shapes as above-mentioned can be applied to the peripheral edge 11a of this flange 11. Further, when the flange 11 is  
10 provided with a lug or projection 15 for picking at the time of fitting the lid to the container body or opening the fitted lid, the outer peripheral edge of this lug 15 is preferably corrugated.

As shown in Fig. 6, when the container body 1 and  
15 the lid 18 are connected to each other for folding at a contact portion 16, corrugated shapes can be applied to the outer peripheral edge of the flange 11 of the container body and the outer peripheral edge of the lid 18 except the outer peripheral edge of the contact  
20 portion 16.

Further, when the projection 15 is projected, the outer peripheral edge of the projection 15 is preferably corrugated.

In the above-mentioned description with  
25 reference to Figs. 5 and 6, substantially the whole

of the outer peripheral edge of the flange 11 of the container body 1 or the lid 18 has a corrugated shape. However, not the whole but optional portions of the outer peripheral edge may have a corrugated shape.

5 In the above-mentioned embodiments, provided is an outwardly extended flange at the opening of the container body or the lid. However, if there is no flange at the periphery of the opening of the container body or the lid, the opening peripheral edge can be  
10 corrugated.

Figs. 7(A) - (C) are illustrative vertically sectional views of three kinds of container bodies. In the case that a flange 11 is provided at the periphery of the opening as shown in Fig. 7(A), the outer  
15 peripheral edge (T1 in Fig. 7(A)) of the flange 11 can be formed in a corrugated shape. In the case of a container body having a shape as shown in Fig. 7(B), the outer peripheral edge T2 can be formed in a corrugated shape. And in the case of a container body  
20 having a shape as shown in Fig. 7(C), the outer peripheral edge T3 can be formed in a corrugated shape.

Figs. 8(A) and 8(B) are illustrative vertically sectional views of examples of the shape of a lid. In the case of Fig. 8(A), the outer peripheral edge T4  
25 of the flange of the lid can be formed in a corrugated

shape. And in the case of Fig. 8(B), the downward opening peripheral edge T5 encompassing the opening can be formed in a corrugated shape.

Now, a method for manufacturing a container body of Fig. 3 will be described with reference to Figs. 9 and 10 in the following.

A synthetic resin sheet from a whole roll is fed on a metal mold P1 for molding. The sheet is deformed in line with the shape of the metal mold P1, then transferred to a trimming die and cut by a cutting machine having e.g. a Thomson blade, whereby a molded container is separated from the sheet.

One example of a metal mold P1 for molding is shown in Fig. 9. In the metal mold P1 for molding, at least the part for molding a flange 11 is formed in a corrugated shape W finely corrugated in the vertical direction. By molding a sheet using this metal mold P1, the flange 11 of the container body 1 can be formed in a vertically corrugated shape.

Fig. 10 shows an example of cutting operation of a container body molded of a sheet by a trimming die P2. In this example, a Thomson blade C is used. The edge of the Thomson blade C is formed in a corrugated shape corrugated in the direction vertical to the paper surface of the drawing. By using such a Thomson blade

C, the peripheral edge of the flange can be corrugated in waveforms not only in the vertical direction but also in the horizontal direction.

If a flange has been corrugated in the vertical direction as shown in the embodiments of Figs. 3 and 4, the outer peripheral edge of the flange cut by a cutting blade such as a Thomson blade having a straight blade edge is vertically waved in a side view (in the horizontal direction), though it is straight in a plan view. Therefore, by preliminarily corrugating a flange in the vertical direction, a cutting blade having a straight blade edge can be used, so that a packaging container can be easily manufactured.

It is preferable that an opening peripheral edge of a packaging container is cut in an atmosphere temperature range of  $15^{\circ}\text{C}$  -  $55^{\circ}\text{C}$ . This is because if the temperature of a molded product is not higher than  $15^{\circ}\text{C}$ , the molded product is apt to be cracked to become a bad product, and on the contrary, the temperature of a molded product is not lower than  $55^{\circ}\text{C}$ , the molded product is apt to be softened and deformed.

Although embodiments of the present invention have been described and illustrated in detail, it is clearly understood that these are by way of illustration and example only and are not to be taken

by way of limitation, and the spirit and scope of the present invention are limited only by the terms of the appended claims.

This application corresponds to the Japanese  
5 Patent Application No.2002-226431 filed in the Japan  
Patent Office on August 2, 2002 and the Japanese  
Patent Application No.2003-103250 filed in the Japan  
Patent Office on April 7, 2003, and the whole  
disclosures of these Japanese applications are  
10 incorporated in this application by citation.